

**USER GUIDE FOR
DATALINE-X™
DATABOX
AND
TRANSDUCERS**

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Dataline-X Databox and Transducers, Part Number 06377SM, Issue 2, Dec 1995.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the manual before attempting to operate or work on the equipment.

Simrad Ltd disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

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CONTENTS**1.1 Introduction to the MK4 DATABOX and DATALINE-X SERIES****1.1 Introduction to the MK4 DATABOX and DATALINE-X SERIES**

The MK4 Databox represents a significant enhancement to the earlier versions, which have earned a well respected position in the world of marine instrumentation.

This latest version continues a tradition of quality, ruggedness, and reliability combined with a technically advanced central processing system. The DATALINE-X series design offers satisfying benefits to owners, users, boat builders, and installation specialists.

Packaged in two different forms, there is the 12 volt DC slim ABS case option, and for larger vessels the 24 volt DC black anodised aluminium enclosure option.

The DATALINE-X system, as the name implies, is based on a single cable which carries both the power and the data around the boat on a serial databus using a communication language called NMEA 0183. This language is an established industry standard, and since DATALINE-X provides both NMEA 0183 inputs and outputs, compatibility is achieved with other navigational aids, such as Satnavs, compasses, plotters, and autopilots, which use the same language. By adopting NMEA 0183 the boat's information system is not subject to the 'closed system' constraints as are some manufacturers' products.

The signal is generated from the Databox which is installed in a safe, dry environment below deck near the mast, or behind the chart table, or perhaps in the engine compartment of a powerboat. All sensors are plugged into the Databox. The dataline itself is then the only cable that runs to the instruments, which are simply linked together in a 'daisy chain' in whatever order suits the installation. All instruments use plug in terminal blocks.

The DATALINE-X system has the capability of linking from one up to fifteen instruments and remains as flexible and as viable for any installation, big or small, power or sail. Since the DATABOX contains the total capability of the system, any additional instrument head can be easily connected into the line without any upgrade to the electronics.

An extensive range of analogue and digital instrument heads provides unparalleled flexibility for use in cockpit, flybridge, chart table, or indeed any location on the boat.

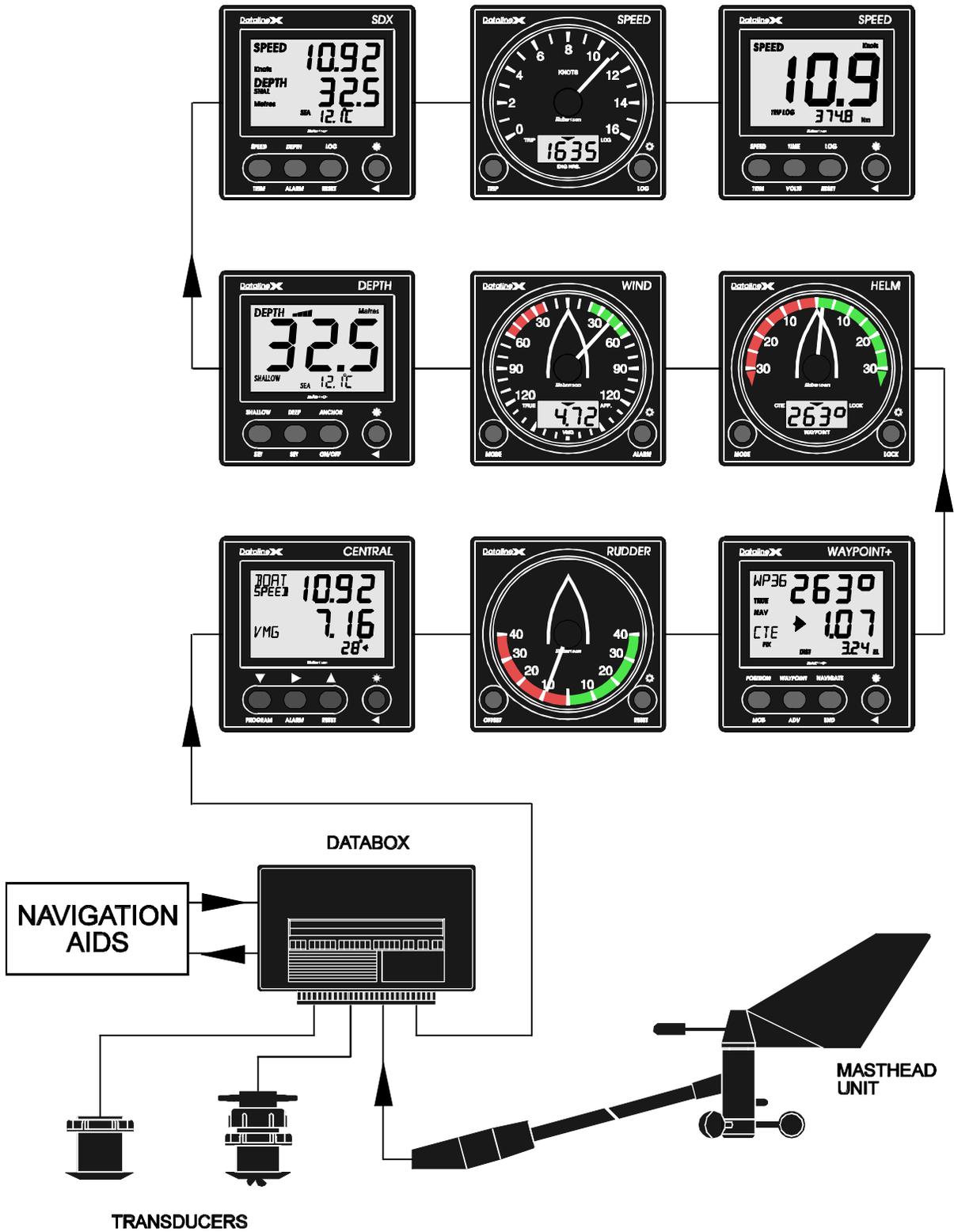


Figure 1 - Dataline-X System Diagram

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2.1 DATABOX Technical Specification

Boatspeed	0 to 99.99 knots, resolution 0.01 knot, accuracy $\pm 3\%$
Windspeed	0 to 99.9 knots, resolution 0.1 knot, accuracy $\pm 5\%$
Windangle	0o to 359o, resolution 1o, accuracy $\pm 3o$
Depth	0.8m to 120m, resolution 0.1m, accuracy $\pm 3\%$ or 2.6ft to 394ft, resolution 0.1ft, accuracy $\pm 3\%$
Distance log	Cumulative - 0 to 9999.9 nautical miles, resolution 0.1nm, accuracy $\pm 3\%$ Trip - 0 to 999.99 nautical miles, resolution 0.01nm, accuracy $\pm 3\%$
Engine hours x 2	0 to 9999.9 hours, resolution 0.1 hour, accuracy $\pm 1\%$
Water temperature	-5° to 40°C, resolution 0.1°C, accuracy $\pm 1^\circ\text{C}$
Fuses	F1, 50mA 20mm, Mast Head Unit supply F2, 2.5A 20mm, main supply
External alarm output	12 volt DC in series with 270 ohms
Satnav output	0 volt in series with 560 ohms open collector output 100 or 200 pulse per nautical mile Satnav output

12 Volt DATABOX

Battery voltage	10V to 16V, resolution 0.1V, accuracy $\pm 0.2V$
Operating voltage	10V to 16VDC
Operating current	130mA + requirements for up to 15 instrument heads (see specific manuals)
Size	212mm x 122mm x 25mm

24 Volt DATABOX

Battery voltage	20V to 30V, resolution 0.1V, accuracy $\pm 0.2V$
Operating voltage	20V to 30VDC
Operating current	130mA + requirements for up to 4 instrument heads (see specific manuals), plus up to 11 more with a separate 12V supply
Size	224mm x 136mm x 60mm

This User guide applies to Databoxes with Serial numbers of /50 and higher.

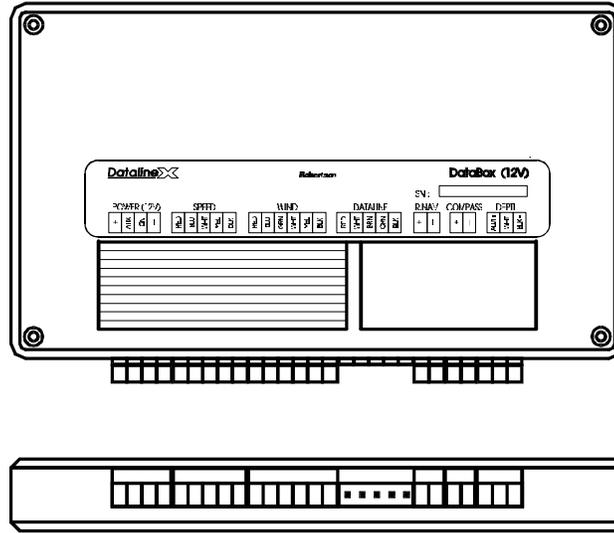


Figure 2.1 - 12V Databox

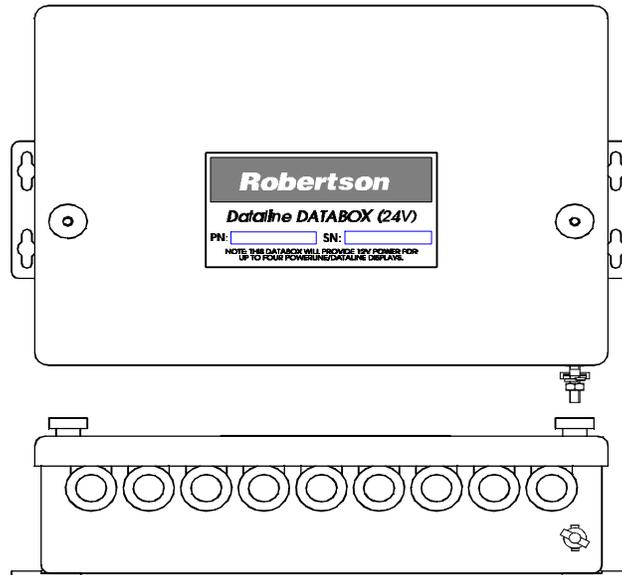


Figure 2.2 - 24V Databox

2.2 DATABOX Installation

The Databox is the sensory centre of the system. All the transducer inputs are fed into the Databox, and all the information is transmitted out on the single Dataline cable. All connections are made with plug-in connectors.

The Databox can be fitted in any convenient but dry position and should be mounted on a flat surface with the self-tapping screws provided. Mark through the databox mounting holes and drill 3mm diameter.

The location should avoid close proximity to electronic compasses, (also 1m from conventional compasses), satellite or radio navigators, and radios, but be selected for easy access to the terminal blocks for the connection of additional equipment and terminal block maintenance.

It is recommended that the cables should be supported with clips close to the terminal blocks. Take care to connect wires as instructed.

Lightly coat the terminal blocks and connections with a suitable corrosion inhibitor (see the note on maintenance).

The 12V power supply cabling should be 5 amp 2 core and connected to a 5 amp fuse or circuit breaker.

WARNING - DO NOT OVER TIGHTEN THE DATABOX FIXING SCREWS.

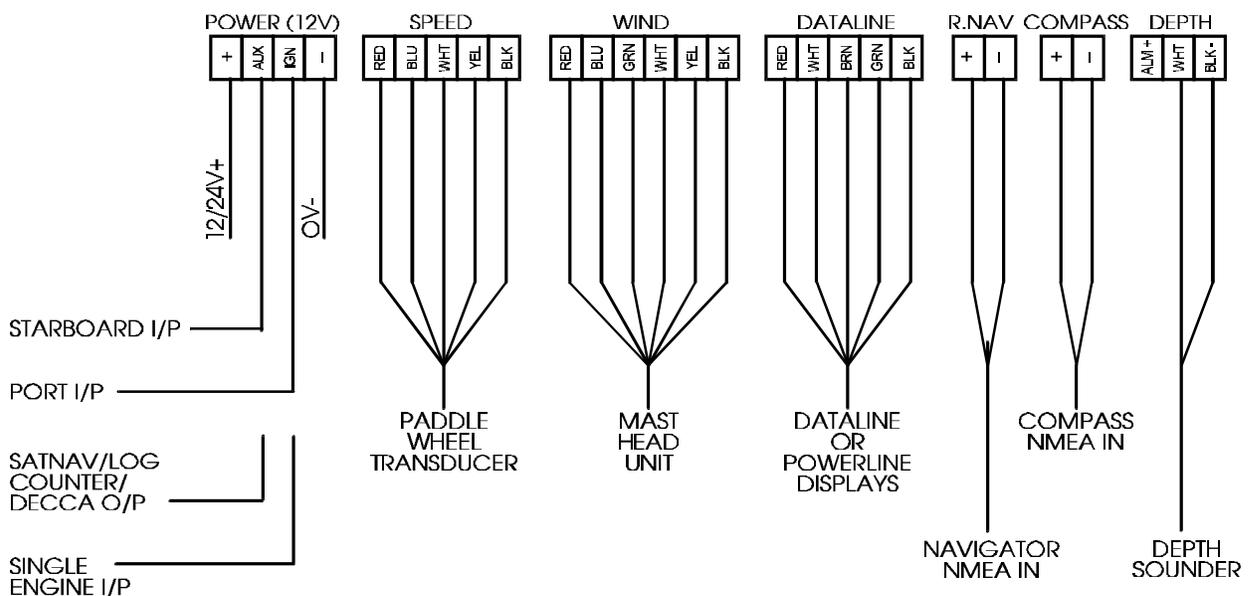


Figure 2.3 - Databox Connections

2.2.1 Engine Hour / Battery Volts / Sat Nav Operation and Connections

The Mk4 Databox has two engine hour counter inputs, which each have a battery voltage measurement capability, and it has the capability to be set up for a 100 pulse per Nautical Mile Sat Nav output. The Databox engine hour counters will run even if the Dataline-X system is not powered up.

There will eventually be four possible configurations of the IGN and AUX terminals on the Mk4 Databox, as below:

- i) 2ENG = Two Engine Hour Inputs, each measuring the appropriate battery bank voltage.
- ii) 1ENG = One Engine Hour Input and engine battery voltage measurement, plus another battery voltage measurement.
- iii) Sat1 = One Engine Hour Input and engine battery voltage measurement, (SATN) plus a 100 pulse per Nautical Mile Sat Nav output.
- iv) SAT2 = One Engine Hour Input and engine battery voltage measurement, plus a 200 pulse per Nautical Mile Sat Nav output.

Note that at present only the 1ENG, 2ENG and SAT1 options are available with the standard Databox software, and the SAT2 option can be obtained with special software.

It is advisable to check with the engine instrument manufacturer prior to connection.

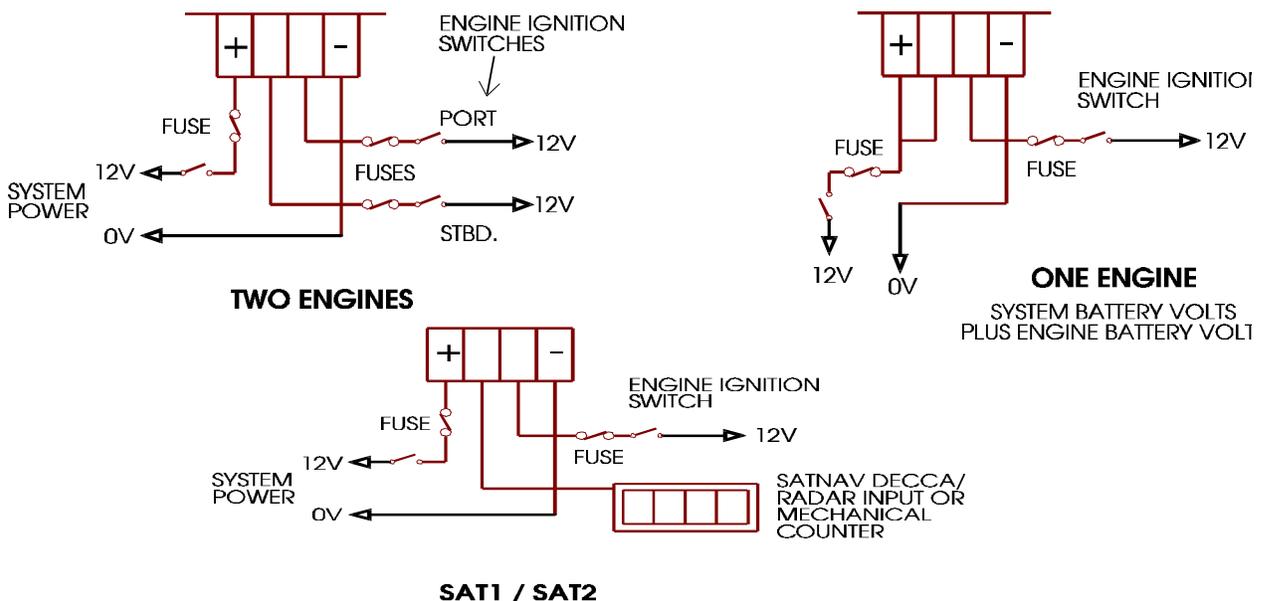


Figure 2.4 - Connection diagrams

Installation details are as follows:

Two Engine / Battery Volts Option - 2ENG

1. The set up on the SDX / SPEED displays should be for 2ENG, (this is the default on shipping).
2. The 12V (or 24V) engine ignition switch signals should be taken to the IGN connection for the port engine, and to the AUX connection for the starboard engine.
3. The battery voltage measurements are made on the two engine hour inputs, so for correct port and starboard bank battery voltages to be measured the supplies that are switched to the IGN and AUX inputs for the engine hour measurements should be from the correct battery banks. Generally it is the case that the two engine ignition signals are each from one of the two separate battery banks, and so this will be automatically done.

100 Pulse per Nautical Mile Sat Nav Output / One Engine / One Battery Volts Option - SAt1 / SAtN

1. The set up on the SDX / SPEED displays should be for SAt1 (or SAtN).
2. The 12V (or 24V) engine ignition switch signal should be taken to the IGN connection.
3. The battery voltage measurement is made on the engine hour input, so for a correct engine bank battery voltage to be measured the supply that is switched to the IGN input for the engine hour measurement should be from the engine supply (or engine start) battery bank. If an alternative battery supply is to be monitored then this needs to be switched with the engine ignition.
4. The Sat Nav output is from the AUX connection, this will give 100 pulses per Nautical Mile in the same manner as the Mk3 Databox Sat Nav output.
5. If the Sat Nav output is used to drive a relay then it is possible that the power supply to the other side of the relay will run some of the system through the relay coil even if the instruments are not turned on, and so the relay power supply should be switched together with the instrument power supply.

One Engine / Two Battery Volts Option - 1ENG

Note that Databoxes of build standard 50 will not allow the Speed or SDX displays to show this option. Databoxes of Build Standard 51 onwards will allow the displays to show this option, but on powering down and back on again it will have returned to the 2ENG option.

1. The set up on the SDX / SPEED displays should be for 1ENG, however this option does not yet function.

2.2.2 External Alarm Connections

An external alarm, (any DC buzzer not exceeding 35mA), can be connected to the Databox to provide additional audible warnings for -

Shallow Alarm	Will sound on calibrated safety shallow alarm or resettable shallow alarm.
Deep Alarm	Will sound on resettable deep alarm.
Anchor Watch Alarm	Will sound if depth increases or decreases by more than 1 metre in 40 seconds.
Windspeed Alarm	Will sound if windspeed is higher than the value entered on either the Wind or Tack heads.

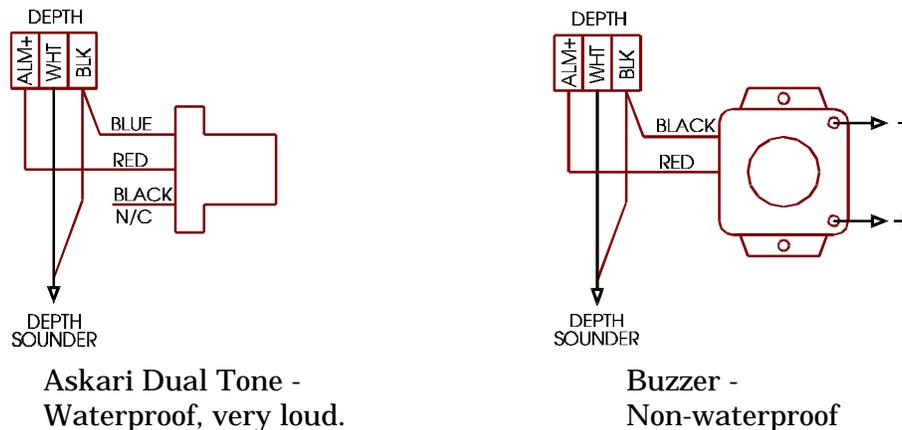


Figure 2.5 - Alarm Connections

Other 12V self oscillating alarms may also be used, the positive input should be connected to the 'ALM+' terminal, and the negative input to the 'BLK' terminal.

Various Technical bulletins are available for connecting equipment from other manufactures. Consult the Simrad dealer.

2.3 Maintenance

The Databox has been designed with the best materials and requires little maintenance. At the end of each season check the connections and the terminal blocks and coat with a liberal amount of silicone grease, vaseline, WD40, or

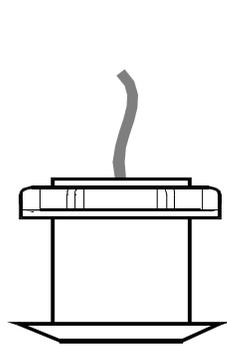
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similar corrosion inhibitor. These materials will not harm any Databox components.

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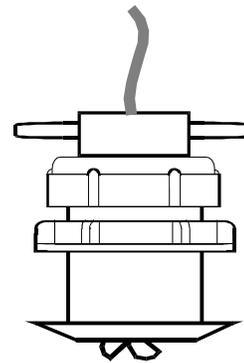
- 3.1 Transducer Specification
- 3.2 MHU (Mast Head Unit) Installation
- 3.3 Log Transducer Installation
- 3.4 Sounder Transducer (Depth)
- 3.5 Maintenance

3.1 Transducer Specification

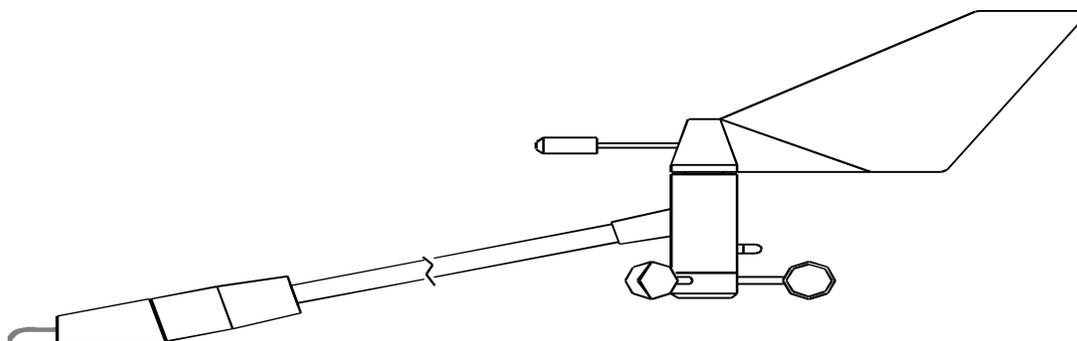
Boatspeed	Hall effect type Maximum speed -Standard paddle - 25 knots High speed paddle - 45 knots Size (plastic or bronze) - 45mm (1¾") diameter
Windspeed	Hall effect type, 1 pulse per revolution
Windangle	3-phase potentiometer (dessyn), 360° rotation
Depth	Operating frequency 205KHz Size (plastic or bronze) - 45mm (1¾") diameter



Depth Sounder



Paddlewheel Log



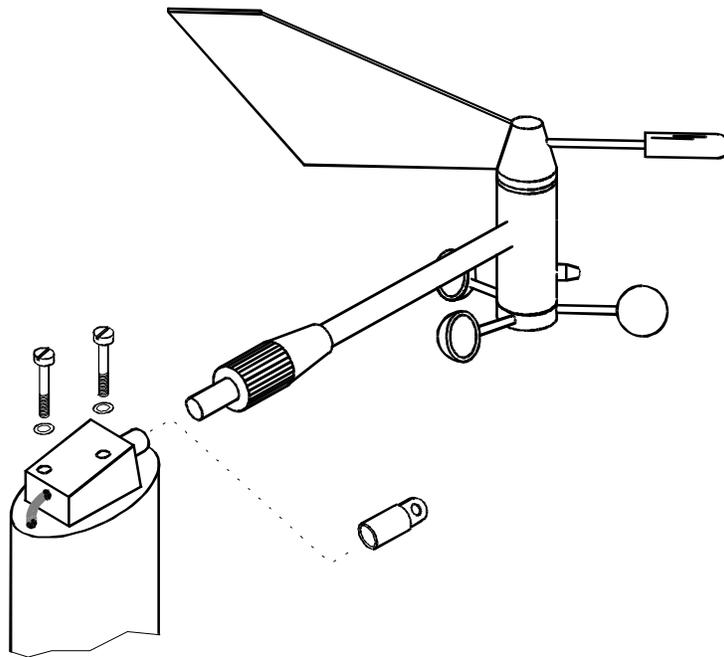
Mast Head Unit

Figure 3.1 - Transducers

3.2 Mast Head Unit (MHU) Installation

The MHU is for sensing windspeed and windangle.

The masthead block should be aligned on the masthead plate with the threaded spigot normally facing forward. Accuracy is not important as there is a $\pm 180^\circ$ calibration range. Please note that the boat's rigging may not allow the MHU to be mounted forward, if so it can be mounted at any other convenient angle and calibrated accordingly.



However, the sail up-draughts could effect the accuracy of the transducers at an angle other than forward.

Using the block as a template, mark out the centre positions for the attachment bolts. Drill 2 small pilot holes, and then drill out to 4.2mm diameter, and then tap an M5 screw thread.

Fit the masthead block using a sealing compound and the M5 fixings provided.

Figure 3.2 - Mast Head Unit

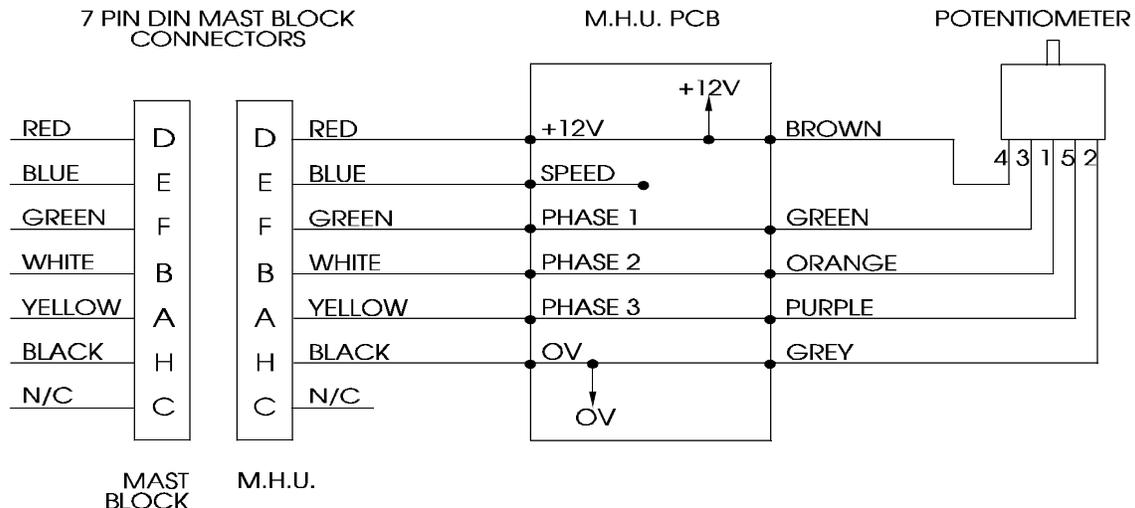


Figure 3.3 - Wiring for Mast Head Unit

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It is important to oil the mast head unit at least once each season.

3.3 Log Transducer Installation

The transducer must be positioned so that it is always under water, near the centreline but at least 150mm away from the keel either side. In a sailing yacht a position 150mm forward of the keel is preferable in order to minimise tack to tack speed inaccuracies, caused by flow past the leading edge. For powered vessels, position just ahead of the engines for access, minimal electrical interference, and correct speed function.

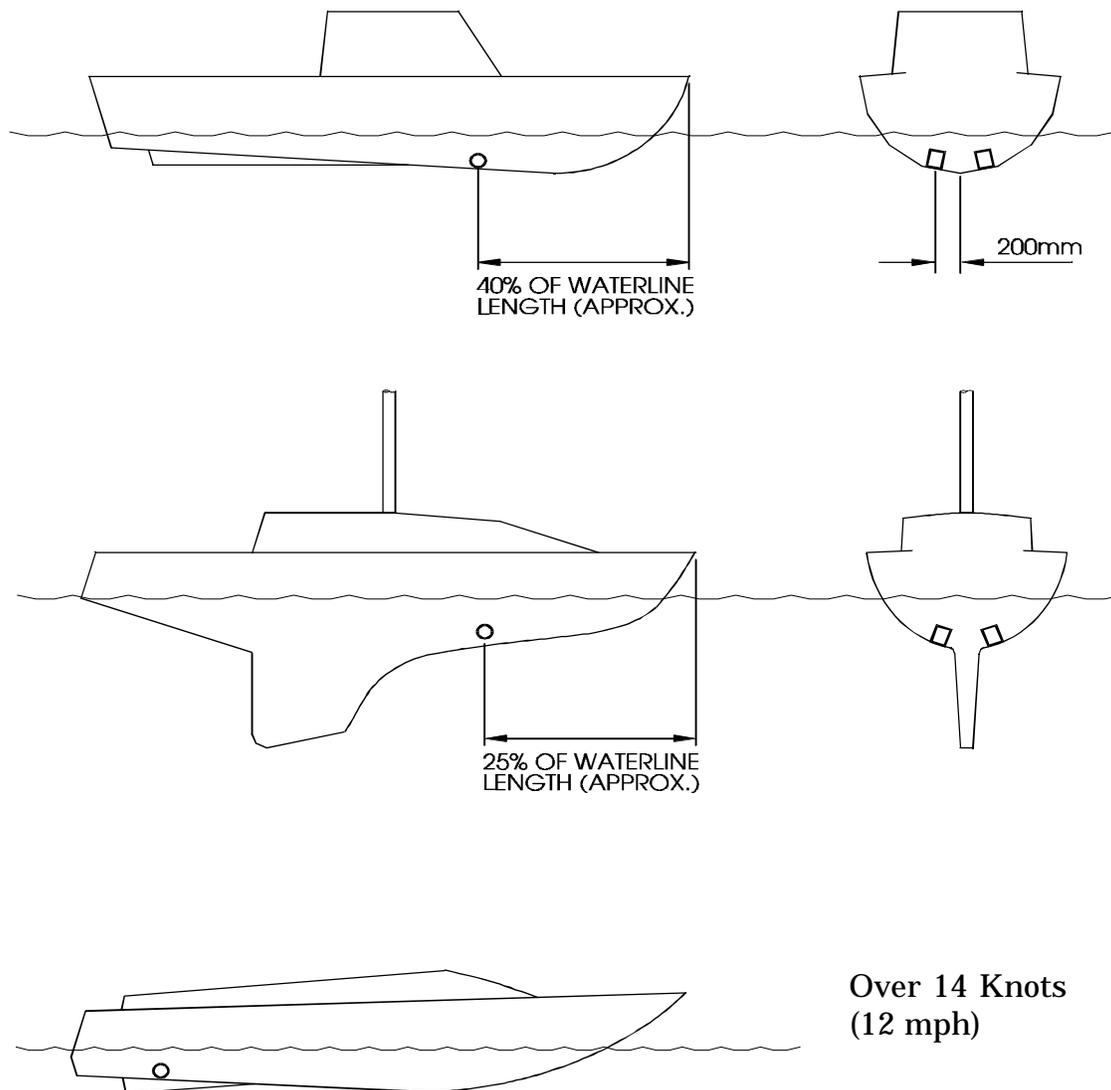


Figure 3.4 - Recommended positions

The hole for the skin fitting should be positioned well clear of any internal frames or stringers. Keep clear of strop lifting points and areas where damage could result from trailing or launching. Ensure good access for removal of the paddlewheel assembly and the subsequent mopping up of water spilled. Drill a small pilot hole first and check its location inside and out, then using a 45mm (1¾") diameter cutter in a hand or electric drill cut the required hole.

Now file a small keyslot to match the hull skin fitting. Assemble the skin fitting and nut using a good sealing compound such as silicone rubber or mastic to make watertight. Do not over tighten the nut.

Check that the bore of the skin fitting is absolutely free of sealing compound. The blanking plug supplied or the transducer can now be inserted with the 'O' ring seals greased and correctly fitted with the cap nut lightly tightened.

The paddlewheel transducer should be installed in the skin fitting with the stainless steel cross pin normally pointing fore and aft. Any other alignment may give faulty readings. It may be found that different speed readings are obtained on opposite tacks, and to overcome or reduce this error, turn the transducer a little. If a suitable position is found which gives equal speeds on both tacks, then mark the position on the hull for future reference when removing, cleaning and replacing.

When transporting or anti-fouling the boat, always have the blanking plug fitted to avoid coating the bore of the skin fitting. It is important to anti-foul the skin fitting as well as the hull, as weed growth around it can cause the log to give incorrect readings or stop.

WARNING - The whole assembly should be checked for leaks immediately the vessel is launched, and rechecked within 8 to 24 hours.

When a High Speed Paddlewheel transducer is being installed (recommended for vessels capable of more than 28 knots), it is important that the flat of the blade, or the blue marker on the cross pin, points to the front of the boat.

3.3.1 Transducer cable routing

The transducer cable should be routed away from all other cables to or from the Databox, and via the shortest practical route. The cable must not be included in the main wiring loom. If the most direct route is near sources of interference such as an engine or fluorescent lights, etc., then a longer route away from these must be chosen. The log and sounder transducer cables may have to follow a similar route, but must not be tied together at any point along their length. A 10mm gap is recommended between these cables.

3.4 Sounder Transducer (Depth)

To maximise performance of this transducer it should be mounted through the hull with the face of the transducer in direct contact with the water. The position should be well below the waterline in an area of minimum turbulence, e.g. not behind or under hull projection or outlet pipe likely to generate air bubbles. The sounder face should be within 18° of horizontal to maintain range. On a yacht a position ahead of the keel is ideal. In a faster powerboat a position aft is preferable. If the transducer can not be flush with the hull, a wooden fairing block will be required with a matching block inside the hull.

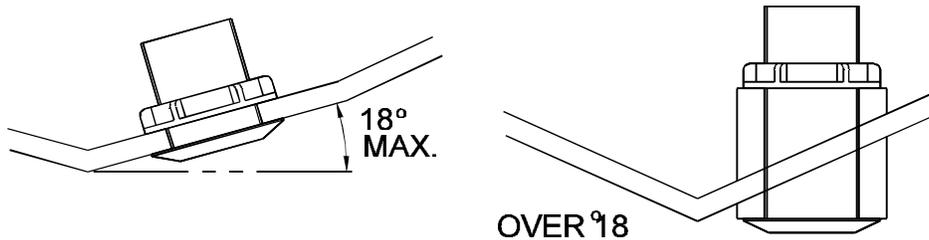


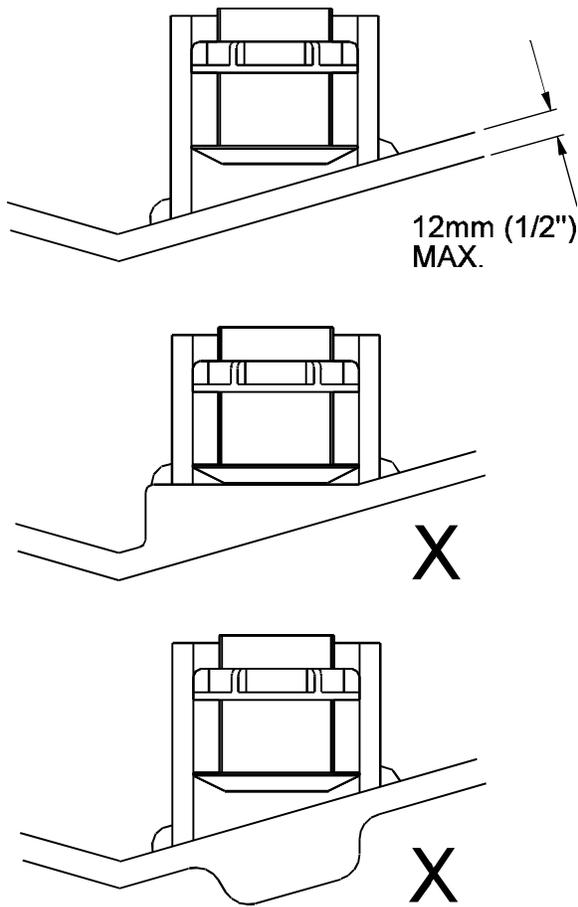
Figure 3.5 - Through hull sounder installation

The process of fitting the sounder transducer is similar to that of the log transducer. Do not over tighten the nut.

The transducer cable must be routed well clear of sources of electrical interference, e.g. alternators and ignition wiring. Check for correct operation before final fixing. Do not shorten the transducer cable, excess cable can be coiled and secured, well away from electrical interference.

Anti-fouling should be limited to one thin coat of MICRON CSC or similar soluble anti-fouling over the face.

WARNING - The whole assembly should be checked for leaks immediately the vessel is launched, and rechecked within 8 to 24 hours.



To save drilling through a hull made from GRP less than 12mm thick, the wet box method of installation can be used, although a reduction in depth performance will occur.

The transducer may be mounted in the hull using a wet box made from 68mm (2½") PVC pipe, 63mm internal diameter and about 150mm long, and charged with castor oil or water. The pipe should be cut to match the hull angle to ensure the transducer is mounted vertically. Bond to the hull using a silicone sealant. Oil or water must not be allowed to leak from the final assembly. Please note that the signal leaves the hull approximately normal to the hull surface, and deadrise angles greater than 18o will result in depth sounder inaccuracy.

Figure 3.6 - Wet box sounder installation

3.4.1 Various Transducer Connections

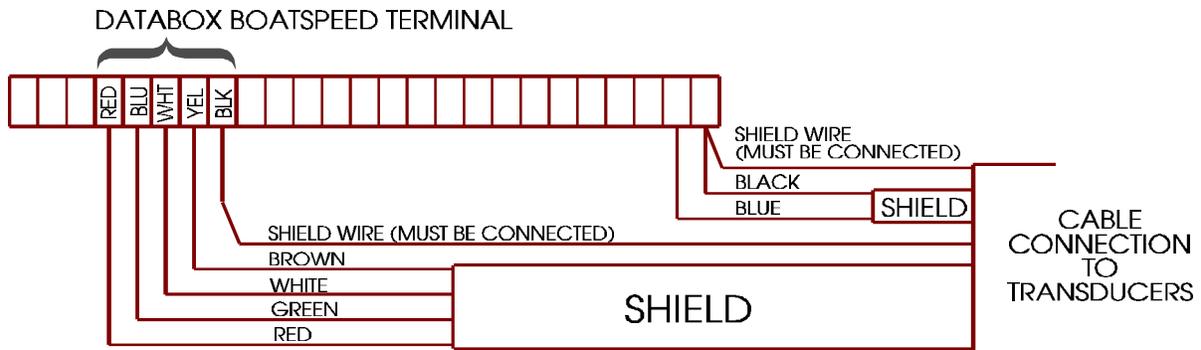


Figure 3.7 - Transom Transducer
(200KHz sounder - Hall effect paddlewheel)

NOTE - For all sounders the screen must be left connected to the black.

Connection to Micro Paddle Transducers

When installing Dataline-X to a vessel having a Stowe Micro Log 210, the yellow and white 'SPEED' terminals should be linked together, and the other connections should be as shown.

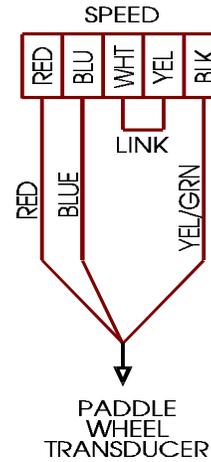


Figure 3.8 - Micro Log Connections

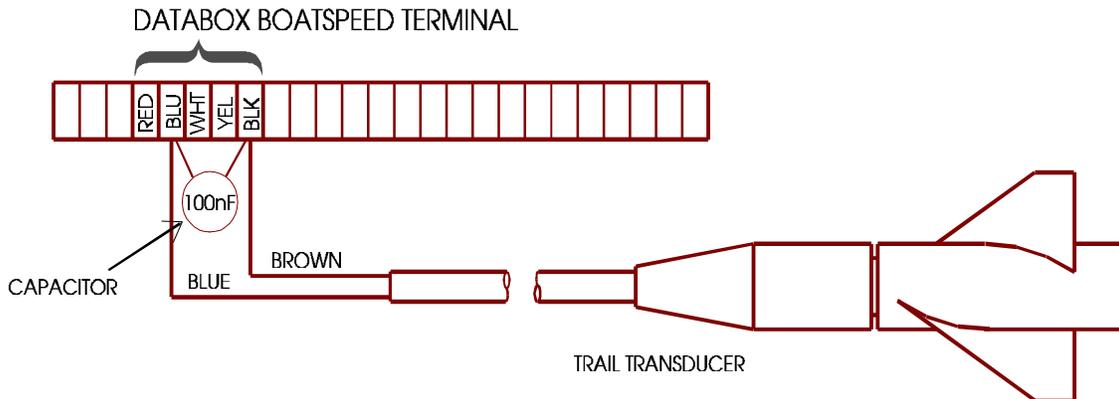


Figure 3.9 - Trail Transducer

3.4.2 External Wind, Speed, Log, and Depth NMEA Data Input

In order to use an external wind, speed, or depth system, connect the NMEA output of that system to either of the 'Compass' or 'R.Nav' NMEA inputs, whichever is unused. If both are in use already then contact the Simrad dealer for advice. If another wind or boat speed sensor is to be used ensure that there are no connections to the 'Wind' or 'Speed' terminals on the Databox. Optionally, the system can be switched between the external data input and the local sensors, ask the Simrad dealer for advice in this case.

If another depth sensor is to be used, then use a Dataline-X S/D or DEPTH display to turn the local depth sounder 'OFF'. The local depth sounder will override the external input by setting it back to 'ON' from the display.

The NMEA messages which are received by the Databox are listed in Part 5, and should enable connection to many manufacturers products. It is advisable to check these messages against the output of the chosen equipment.

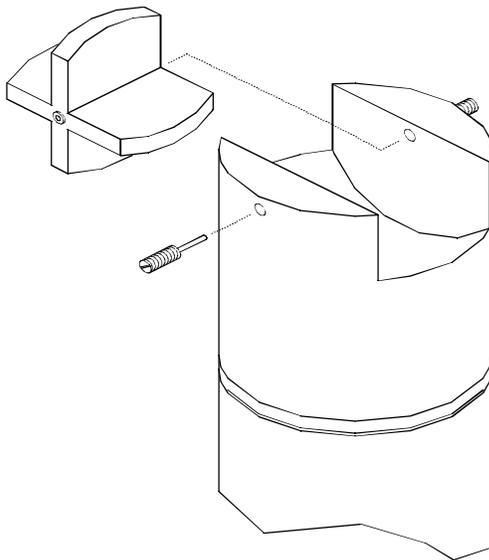
3.5 Maintenance

3.5.1 Removal of the Paddlewheel Transducer

Periodically, during use, the cleanliness and ease of rotation of the paddlewheel should be checked. Blowing on the paddlewheel should cause it to rotate rapidly.

Before proceeding with the removal of the paddlewheel, make sure that the blanking plug supplied is close at hand. It is advisable to use a large sponge to minimise water ingress and to mop up later.

1. Unscrew the cap nut. Water is prevented from entering the boat by the lower 'o'ring seal.
2. Quickly lift out the transducer and place and hold the sponge over the hole.
3. Take up the blanking plug and quickly insert into the skin fitting, lightly screwing up the cap nut.
4. The paddlewheel can now be examined and if necessary cleaned.



Cleaning the paddlewheel can be done using soft tissue or cottonwool, and it is important to clean the housing around it thoroughly. If required, the paddlewheel will drop out by withdrawing the bearing pins sufficiently (using a small screwdriver).

After cleaning, paint both the housing and the paddlewheel with a thin coat of MICRON CSC or similar soluble anti-fouling.

Do not allow the paint to snag the bearing pin holes.

Figure 3.10 - Removal of the paddlewheel

3.5.2 Seavalve

The seavalve is a relatively simple product designed to reduce the intake of water when removal of the log transducer is required. It attaches to the top of the 2" skin fitting thus extending the overall height, and therefore must be used with a 4" version of transducer and blanking plug.

The seavalve has two sprung flaps which close on to one another as the transducer or blanking plug is withdrawn, and swivel clear when either is installed.

WARNING - The seavalve does not seal the hole, therefore a blanking plug must be inserted to stop any ingress of water.

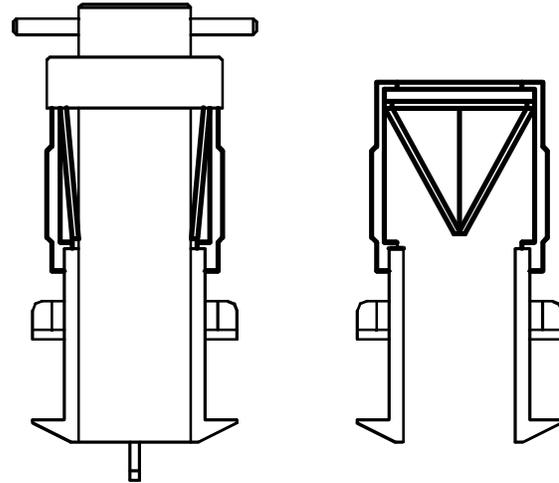


Figure 3.11 - Seavalve
(with and without transducer)

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4.1 Fault Finding Chart

4.1 Fault Finding Chart

This chart assumes the use of a Dataline-X system. If an instrument is connected to another system then perform the equivalent checks on that system.

General Display and Communications Faults

CONDITION	PROBABLE CAUSE	ACTION
All instruments have blank displays.	No 12V Power Supply	<p>Check that the ships instrument system fuse(s) or circuit breaker(s) are not blown / tripped.</p> <p>Check the power supply wiring to the Databox.</p> <p>Check the 2.5A fuse inside the Databox. (This is the leftmost of the two fuses inside the Databox when it is viewed with the connectors at the lower edge, with the top cover removed. In order to remove the top cover to the Databox first remove the four screws in its corners.)</p> <p>Check the power supply wiring from the Databox to the instruments (the Red and Black Dataline wires).</p> <p>Check for the Dataline-X instruments powering up, if not connected to the Databox, but directly to the power supply.</p> <p>Contact your dealer.</p>
One or more, but not all, instruments have blank displays.	There is no 12V power supply to the affected instrument (s).	<p>Check the power supply wiring to the affected instrument(s) (the Red and Black Dataline wires). This is almost certainly the problem if more than one instrument is not functioning.</p> <p>Contact your dealer.</p>
All instruments always show ----, with the pointers of analogue instruments at their zero positions.	No data is reaching any of the instruments.	<p>Check that the battery voltage at the Databox Power Input terminals is greater than 10V.</p> <p>Check the signal wiring from the Databox to the instruments (the White and Green Dataline wires). (If the lighting on any instrument can be controlled from another instrument then this is not the problem.)</p> <p>Contact your dealer.</p>
One or more, but not all, instruments always show ----, with the pointers of analogue instruments at their zero positions.	No data is reaching the affected instrument(s).	<p>Check the signal wiring to the affected instrument(s) (the White and Green Dataline wires). This is almost certainly the problem if more than one instrument is affected. (If the lighting on any affected instrument can be controlled from another instrument then this is not the problem).</p>

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	Contact your dealer.
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General Display and Communications Faults (cont'd)

CONDITION	PROBABLE CAUSE	ACTION
<p>All instruments show question marks on their display after they are used to set the lighting level, and the lighting level soon returns to Off, but other data is correct.</p> <p>Or:</p> <p>All instruments show question marks after setting any other data values.</p>	<p>The lighting level or other data is not reaching the Databox.</p>	<p>Check the return signal wiring to the Databox (the Brown Dataline wire).</p> <p>Contact your dealer.</p>
<p>One or more instruments show question marks on their display after they are used to set the lighting level, and the lighting level soon returns to the previous level, but other data is correct, and other instruments can set the lighting level correctly.</p> <p>Or:</p> <p>One or more instruments show question marks after setting any other data values.</p>	<p>The lighting level or other data is not reaching the Databox from the affected instrument(s).</p>	<p>Check the return signal wiring from the affected instruments to the Databox (the Brown Dataline wire).</p> <p>Contact your dealer.</p>

Speed and Temperature Display Faults

CONDITION	PROBABLE CAUSE	ACTION
There are no Boat Speed or Sea Temperature displays, or these displays always show '----'.	The speed transducer is not connected to the Databox properly.	<p>Check the speed transducer's connections to the Databox (especially the White and Yellow 'Speed' wires).</p> <p>Check that the speed transducer cable is not damaged.</p> <p>Contact your dealer.</p>
The Boat Speed display always shows '0.0', but the Sea Temperature display is shown.	<p>The speed transducer is not installed in the hull fitting.</p> <p>The speed transducer is not connected to the Databox properly.</p> <p>Jammed paddle wheel.</p> <p>Damaged paddle wheel or transducer body.</p>	<p>Check, and replace the blanking plug with the transducer if necessary.</p> <p>Check the speed transducers connections to the Databox (especially the Red, Blue and Black 'Speed' wires).</p> <p>Check that the speed transducer cable is not damaged.</p> <p>Clean the paddle wheel and transducer as required.</p> <p>Check that the paddle wheel and transducer is not damaged, and that there are not 'holes' at the end of any of the paddle wheels vanes.</p> <p>Contact your dealer.</p>
The Boat Speed is too low, when it was previously correct.	<p>Dirty paddle wheel or hull.</p> <p>Damaged paddle wheel or transducer body.</p> <p>The paddle wheel is not aligned fore / aft within the skin fitting.</p>	<p>Clean the paddle wheel and / or the hull as required.</p> <p>Check that the paddle wheel and transducer is not damaged, and that there are not 'holes' at the end of any of the paddle wheels vanes.</p> <p>Check, and if necessary turn the transducer within the skin fitting so that the cross pin is aligned with the centre line of the vessel.</p> <p>Make other checks as for 'always showing 0.0' above.</p>
The Boat Speed has always been too low or too high.	The speed transducer is not calibrated.	<p>Calibrate the speed transducer. (Using another instrument.)</p> <p>Make other checks as for 'the speed is too low when it was previously correct' above.</p>

Speed and Temperature Display Faults (cont'd)

CONDITION	PROBABLE CAUSE	ACTION
The Boat Speed is too low or too high and cannot be corrected by calibrating the speed transducer.	The hull form produces exceptionally low or high water speed over the paddle.	Check the siting of the speed transducer. Contact your dealer.
The Boat Speed is different on each tack.	The hull form and transducer siting produces different water flow rates over the paddle wheel on each tack.	Turn the speed transducer slightly so that the cross pin is not aligned directly fore / aft, and recheck for the same speed display on both tacks. Repeat this until the correct angle is found for the same reading on each tack, and then recalibrate the transducer. (Using another instrument.)
The Sea Temperature display is incorrect.	The speed transducer is not connected to the Databox properly.	Check the speed transducers connections to the Databox (especially the White and Yellow 'Speed' wires). Check that the speed transducer cable is not damaged. Check that the Sea Temperature is in fact incorrect by comparing with another temperature sensor. Contact your dealer.

Depth Display Faults

CONDITION	PROBABLE CAUSE	ACTION
<p>The maximum depth capability is less than expected.</p> <p>Or:</p> <p>The performance at very low depths is unsatisfactory.</p> <p>Or:</p> <p>The Depth display always shows flashing numbers or flashing '0.0'.</p>	<p>The depth transducer is not connected to the Databox properly.</p> <p>There is a poor 12V Power Supply to the Databox.</p> <p>The power supply voltage is too low.</p> <p>The depth transducer cable is not the correct length.</p> <p>There is marine growth on the face of the depth transducer.</p> <p>If an in-hull depth transducer the transducer bonding may be broken or there may be insufficient oil to form a good interface between the transducer and the hull.</p> <p>If an in-hull depth transducer the GRP may be too thick or be poorly laid up in the region of the transducer.</p> <p>The depth transducer may have been damaged by impact, or by the boat being lifted with a strop over the transducer.</p>	<p>Check the depth transducers connections to the Databox.</p> <p>Check that the depth transducer cable is not damaged.</p> <p>Check the Power Supply connections to the Databox (the '+' and '-' 'Power' wires).</p> <p>Check that the Power Supply wires are not damaged.</p> <p>Check that any fuses fit their holders correctly and are not loose.</p> <p>Check that the wire that has been used for the Power Supply is of sufficient size.</p> <p>Check the battery condition, and charge or change the battery if required.</p> <p>Check that the depth transducer cable was not cut or lengthened during the system installation.</p> <p>Check for growth and LIGHTLY scrub or sand the face of the transducer to remove it if necessary.</p> <p>Check and correct if necessary.</p> <p>If possible move the transducer to a more suitable location, or mount through the hull.</p> <p>Test with another transducer if possible.</p> <p>Contact your dealer.</p>

<p>The Depth display is normally correct but occasionally shows unexpected low readings.</p>	<p>Probably moving over weed, fish, or other obstacles.</p>	<p>No action possible.</p>
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Depth Display Faults (cont'd)

CONDITION	PROBABLE CAUSE	ACTION
<p>The Depth display is normally correct but occasionally flashes the display unexpectedly.</p>	<p>Probably moving over aerated water, such as the wash from a ferry.</p>	<p>No action possible.</p>
<p>The Depth display is normally correct but flashes the display when travelling at increased or planing speeds.</p>	<p>Probably suffering from aeration in front of the transducer face.</p>	<p>Check the siting of the depth transducer.</p> <ol style="list-style-type: none"> 1. There should be no skin fittings or other obstructions in front of it. 2. It should be well faired into the hull without any large steps. 3. It should be mounted well to the rear of the hull in planing vessels, and not mounted in or near propeller tunnels. <p>Make the checks for poor depth performance as above.</p> <p>Contact your dealer.</p>

Wind Display Faults

CONDITION	PROBABLE CAUSE	ACTION
There are no Wind Speed or Wind Angle displays, or these displays always show ----	<p>The wind transducer is not fitted to the mast head connector.</p> <p>The wind transducer is not connected to the Databox properly.</p> <p>50mA fuse blown.</p>	<p>Check, and fit the transducer if necessary.</p> <p>Check the wind transducers connections to the Databox (especially the Green, White and Yellow Wind wires).</p> <p>Check that the wind transducer cable is not damaged.</p> <p>If there is a connector at the foot of the mast check that it is not corroded and is making good contact.</p> <p>Fit new fuse.</p> <p>Contact your dealer.</p>
The Wind Speed displays always show 0.0, but the Wind Angle displays are shown.	<p>The anemometer rotor is seized.</p> <p>The wind transducer is not connected to the Databox properly.</p>	<p>Check the anemometer rotor and have the wind transducer serviced if necessary.</p> <p>Check the wind transducers connections to the Databox (especially the Red, Blue and Black Wind wires).</p> <p>Make the checks as for no wind speed or wind angle displays above.</p>
The Wind Speed is too low, when it was previously correct	<p>Seizing anemometer rotor.</p> <p>Damaged anemometer rotor or transducer body.</p>	<p>Check the anemometer rotor and oil the rotor bearings or have the wind transducer serviced if necessary.</p> <p>Check that the rotor and transducer are not damaged.</p> <p>Make checks as for always showing 0.0 above.</p>
The Wind Speed is too high or erratic, when it was previously correct.	Damaged wiring causing intermittent contact.	Make checks as for always showing 0.0 above.
The Wind Speed has always been too low or too high.	The wind transducer may be poorly sited.	<p>Check the transducer location.</p> <p>Contact your dealer.</p>

Wind Display Faults (cont'd)

CONDITION	PROBABLE CAUSE	ACTION
The Wind Angle displays are incorrect.	The wind transducer is not connected to the Databox properly.	<p>Check the wind transducers connections to the Databox (especially the Green, White and Yellow Wind wires).</p> <p>Check that the wind transducer cable is not damaged.</p> <p>If there is a connector at the foot of the mast check that it is not corroded and is making good contact.</p> <p>Contact your dealer.</p>
The Wind Angle has always been incorrect.	The wind transducer is not calibrated.	<p>Calibrate the wind transducer. (Using another instrument.).</p> <p>Make checks as for the wind angle displays are incorrect above.</p>

Heading and Autopilot Display Faults

CONDITION	PROBABLE CAUSE	ACTION
<p>There are no Heading or Wind Direction displays.</p>	<p>The required data is not being received from the Heading Sensor.</p>	<p>Check that the Heading Sensor is turned on.</p> <p>Check the Heading Sensor NMEA output specification against the instruments input specification. (See Appendix A).</p> <p>Check the Heading Sensor power supply wiring.</p> <p>Check the signal wiring from the Heading Sensor to the Databox.</p> <p>Check that the Heading Sensor is driving other remote displays correctly.</p> <p>Contact your dealer.</p>
<p>There is no Autopilot Set Course display, even though the Heading display is working.</p>	<p>The required data is not available from the Autopilot</p>	<p>Check the Autopilot NMEA output specification against the instruments input specification. (See Appendix A).</p> <p>Make checks as for no heading or wind direction displays above.</p> <p>Contact your dealer.</p>
<p>All Headings are incorrect, by the same amount.</p> <p>Note: When checking a Compass ensure that the check is against a deviated magnetic card compass, or against magnetic bearings, or against a good hand held compass held well away from any magnetic or ferrous objects.</p>	<p>The Heading Sensor is not aligned correctly</p>	<p>Consult the manufacturers instructions.</p>

Heading and Autopilot Display Faults (cont'd)

CONDITION	PROBABLE CAUSE	ACTION
<p>Some or all Headings are incorrect, by different amounts.</p> <p>Note: When checking a Compass ensure that the check is against a deviated magnetic card compass, or against magnetic bearings, or against a good hand held compass held well away from any magnetic or ferrous objects.</p>	<p>The Heading Sensor has not been deviation compensated.</p> <p>Magnetic or ferrous objects have been moved into or away from the vicinity of the Heading Sensor.</p> <p>The location of the Sensor is unsuitable.</p>	<p>Recalibrate the Sensor.</p> <p>Check for possible objects that may affect the Sensor, e.g. a portable radio. If the change is permanent then recalibrate the Sensor.</p> <p>Check that the location of the Sensor is suitable, if not then resite it.</p> <p>Contact your dealer.</p>

Navigation Display Faults

CONDITION	PROBABLE CAUSE	ACTION
There are no Navigation displays, even though the Navigation Receiver is working.	The required data is not being received from the Navigation Receiver	<p>Check that the Navigation Receiver has a position fix.</p> <p>Check that the Navigation Receiver's NMEA output is set-up correctly.</p> <p>Check the Navigation Receiver's NMEA output specification against the instrument's input specification. (See Appendix A).</p> <p>Check the signal wiring from the Navigation Receiver to the Databox.</p> <p>Check that the Navigation Receiver is driving other remote displays correctly.</p> <p>Contact your dealer.</p>
There are no Waypoint Data displays, even though the Course Over Ground display is working.	The required data is not available from the Navigation Receiver.	<p>Check that the Navigation Receiver has a destination Waypoint.</p> <p>Make other checks as for 'no navigation displays', above.</p>
There is no Cross Track Error display, even though the Waypoint and Course Over Ground displays are working.	The required data is not available from the Navigation Receiver.	<p>Check that the Navigation Receiver is in Navigate Mode.</p> <p>Make other checks as for 'no waypoint displays', above.</p>
Rhumb Line/Great Circle selection changes independently, and/or the desired data is not shown, even though the other format is available.	Data of the required format is not being transmitted by the Navigation Receiver.	<p>Check that the Navigation Receiver is set to the same navigation mode, and is set up to transmit the correct navigation format.</p> <p>Contact your dealer.</p>
True / Magnetic Course Over Ground and Waypoint Bearing data is not shown, even though the other format is available.	Data of the required format is not being transmitted by the Navigation Receiver.	<p>Check that the Navigation Receiver is set to the same navigation mode, and is set up to transmit the correct navigation format.</p> <p>Contact your dealer.</p>

Other Faults

CONDITION	PROBABLE CAUSE	ACTION
<p>The external alarm does not sound.</p>	<p>The alarm is not turned on, or the values are not as desired.</p> <p>The external alarm sounder is not connected to the Databox properly.</p> <p>The external alarm sounder is not suitable.</p> <p>The external alarm sounder is not working.</p>	<p>Check that the desired alarm is turned on and has the correct value.</p> <p>Check the alarms' connections to the Databox.</p> <p>Check that the alarm sounder does not require more current or a higher voltage than is available.</p> <p>Check with the alarm sounder driven directly from a suitable power supply.</p> <p>Contact your dealer.</p>
<p>There are missing Engine Hour or Battery Voltage displays, or the Engine Hour counts don't work, or these displays always show '----'.</p>	<p>The engine hour / sat nav set ups are incorrect.</p> <p>The engine hour / battery voltage inputs are not connected to the Databox properly.</p>	<p>Check the set up, and correct if necessary. (Using another instrument.)</p> <p>Check the connections to the Databox, and correct if necessary.</p> <p>Check that the engine inputs are active when the engines are turned on.</p> <p>Contact your dealer.</p>

DATALINE NMEA SENTENCES

The following NMEA 0183A sentences are received by the Databox and transmitted on the Dataline:

AAM Waypoint Arrival Alarm

\$ - - AAM, A, A, XX.X, N, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

APA Autopilot Sentence "A"

\$ - - APA, A, A, X.X, L, N, A, A, XXX, M, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

APB Autopilot Sentence "B"

\$ - - APB, A, A, X.X, L, N, A, A, XXX, M, C - - C, XXX, M, XXX, M<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

BOD Bearing - Origin to Destination

\$ - - BOD, XXX, T, XXX, M, C - - C, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

BWC Bearing & Distance to Waypoint - Great Circle

\$ - - BWC, XXXXXX, XXXX.XX, N, XXXXX.XX, W, XXX, T, XXX, M, XXX.X, N, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

BWR Bearing & Distance to Waypoint - Rhumb Line

\$ - - BWR, XXXXXX, XXXX.XX, N, XXXXX.XX, W, XXX, T, XXX, M, XXX.X, N, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

DBK Depth Below Keel

\$IIDBK, XXXX.X, f,, ,, <CR><LF>

Input via: Compass, R.Nav, or Local TRANSDUCER

Output via: Dataline

DBT Depth Below Transducer

\$IIDBT, XXXX.X, f,, ,, <CR><LF>

Input via: Compass, R.Nav, or Local TRANSDUCER

Output via: Dataline

GGA Global Positioning System Fix Data

\$ - - GGA, XXXXXX, XXXX.XX, N, XXXXX.XX, W, X, XX, X.X, X.X, M, X.X, M, X.X, XXXX<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

GLL Geographic Position - Latitude/Longitude

\$ - - GLL, XXXX.XX, N, XXXXX.XX, W<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

HDM Heading - Magnetic

\$ - - HDM, XXX, M<CR><LF>

Input via: Compass

Output via: Dataline

HDT Heading - True

\$ - - HDT, XXX, T<CR><LF>

Input via: Compass

Output via: Dataline

HSC Heading Steering Command

\$ - - HSC, XXX, T, XXX, M<CR><LF>

Input via: Compass

Output via: Dataline

—

MTW Water Temperature

\$IIMTW, -XX.X, X, C<CR><LF>

Output only via: Dataline

RMA Recommended Minimum Specific Loran-C Data

\$ - - RMA, A, 1111.11, N, YYYYY.YY, E, X.X, X.X, X.X, X.X,
X.X, A<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

RMB Recommended Minimum Navigation Information

\$ - - RMB, A, X.XX, L, C - - C, C - - C, 1111.11, A, YYYYY.YY,
A, X.X, X.X, X.X, A<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

RMC Recommended Minimum Specific GPS/Transit Data

\$ - - RMC, XXXXXX, A, 1111.11, A, YYYYY.YY, A, X.X, X.X,
XXXXXX, X.X, A<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

RSA Rudder Sensor Angle

\$ - - RSA, X.X, A, X.X, A<CR><LF>

Input via: Compass

Output via: Dataline

VHW Boat Speed and Heading

\$IIVHW,, XXX, M, XX.XX, N,,<CR><LF>

Input via: Compass, R.Nav, or Local TRANSDUCER

Output via: Dataline

VLW Distance Travelled through the Water

\$IIVLW, XXXX.X, N, XXX.XX, N<CR><LF>

Input via: Compass, R.Nav, or Local TRANSDUCER

Output via: Dataline

VTG Track Made Good and Ground Speed

\$ - - VTG, XXX, T, XXX, M, XX.X, N, XX.X, K<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

VWR Relative (Apparent) Wind Speed and Angle

\$IIVWR, XXX, L, XX.X, N,,, <CR><LF>

Input via: Compass, R.Nav, or Local TRANSDUCER

Output via: Dataline

WDC Distance to Waypoint - Great Circle

\$ - - WDC, XX.XX, N, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

WDR Distance to Waypoint - Rhumb Line

\$ - - WDR, XXX.XX, N, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

WDR Waypoint Location

\$ - - WPL, XXXX.XX, N, XXXXX.XX, W, C - - C<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

XTE Cross-Track Error, Measured

\$ - - XTE, A, A, X.XX, L, N<CR><LF>

Input via: Compass, R.Nav

Output via: Dataline

ZTG UTC and Time to Destination Waypoint

\$ - - ZTG, XXXXXX, XXXXXX, C - - C<CR><LF>

Input via: Compass, R.Nav

—
Output via: Dataline

Warranty

Warranty

The equipment is guaranteed for 24 months from the date of purchase. If no proof of purchase is available, then the guarantee period will commence from the date of manufacture.

Should the unit have to be returned, adequate packing with 80mm (3") of all round cushioning must be provided. Please quote the serial number in any correspondence.

Whilst every effort has been made to ensure that this document is accurate at the time of going to press, Simrad Ltd. reserve the right to change design and specification without prior notice as part of a continuous programme of product development.

